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minism and free will does not exist for the naturalist—not because he doubts his freedom and responsibility, but because he knows nothing of determinism.

We cannot be surprised that some students of science should confuse their reasonable expectations that the future will, on the whole, be essentially like the past with belief that it must so be, when we remember how often they have been told by philosophers like Ward that the scientific conception of the mechanism of nature is the conception of ‘an unbroken and unbreakable mechanism,’ which ‘absolutely determines’ the order of events, and ‘banishes spirit and spontaneity,’ ‘holding all things fast in fate’; although most men of science are now as emphatic as Berkeley in the declaration that naturalism means nothing of the sort. What they assert that it does mean is that we know nothing of ‘catastrophes.’ As Sir Thomas Browne tells us: “It was the ignorance of man’s nature that begat this very name, and by a careless term miscalled the providence of God; for there is no liberty for causes to operate in a loose or careless way.”

W. K. BROOKS.

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MEDICAL SCIENCES IN THE UNIVERSITY.

TO THE EDITOR OF SCIENCE.—Permit me to call attention to a somewhat inaccurate statement made by Professor Minot in his very interesting address delivered at the Medical Commencement of Yale University and subsequently published in SCIENCE. Professor Minot says: “If a young man wishes to make a scientific career, if his interest is chemistry, physics, botany or zoology, he is received at one of our universities started upon a well-planned course properly systematized, he gives for two or three years most of his strength to his main subject, but he follows probably two cognate subjects as minor studies, and at the end of his time, if successful in his work, he receives a degree, which attests his proficiency in his special science. Should the same young man elect to study one of the medical sciences, physiology, pathology or bacteriology, no university will give him corresponding recognition. The utmost he can find is opportunity for advanced

work in his special subject, but with no university guidance, no plan of correlated studies, and he can look forward to no degree, nor even to a certificate from the university.”

In this University, from its foundation in 1876, physiology has been given complete university standing. Its courses are coördinate in every way with those in chemistry, physics, botany or zoology, and many students have offered it, after three or more years of continuous study, as a major subject for the degree of Doctor of Philosophy. The same may be said with regard to pathology and bacteriology.

I speak only for the Johns Hopkins University, but there are other universities in this country in which physiology is also accorded every privilege in the philosophical faculty.

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September 28, 1899.

NOTES ON INORGANIC CHEMISTRY.

OWING to the difficulties in the way of using acetylene on a large scale as an illuminant, and in part perhaps also owing to the opposition raised by those interested in other methods of lighting, the new illuminant has not made the rapid progress predicted for it. Some towns on the continent of Europe, however, have adopted it, as the town of Veszprim in Hungary, and in a recent number of the *Chemiker Zeitung*, Professor J. Vértess gives a paper on some of the drawbacks which attend the use of acetylene. In the first place the calcium carbide from which it is generated is in commerce never pure, but contains at least 20 per cent. of impurities. Theoretically, 350 liters acetylene per kilo carbide should be obtained, but as a matter of fact in practice hardly more than 280 or 290 liters can be depended upon. Again, the carbide contains sulfur, phosphorus and nitrogen, so that we have as impurities in the acetylene, hydrogen sulfide, phosphine and ammonia; hence it follows that acetylene must be purified in much the same way as ordinary coal gas. While burning from an ordinary burner, after a time the flame becomes smoky and carbon is deposited on the burners. This seems to be owing to the burner attaining a temperature higher than that of the decomposition of acetylene. Vértess also